

EXHIBIT 2

Expert Report of Lance Phillips

November 18, 2024

Expert Report Related to Illinois River and Tenkiller Ferry Lake, Oklahoma
Prepared by: Lance Phillips, Oklahoma Water Resources Board
November 18, 2024

Assignment:

I was asked to review findings by the Court regarding the Illinois River, made on the evidentiary record developed in the 2009-10 trial, and to render an expert opinion as to whether these still hold true today. Specifically, I was asked to review the following findings:

1. Phosphorus concentrations in rivers and streams of the Illinois River Watershed (IRW) in Oklahoma are elevated beyond natural or background levels in violation of Oklahoma's antidegradation standards for these waters. See Okla. Admin. Code 252:730-3-2(a).
2. Phosphorus concentrations in the Illinois River, Flint Creek and Barren Fork Creek exceed the total phosphorus criterion applicable to scenic rivers, and the aesthetics beneficial use is impaired for total phosphorus in violation of Oklahoma Water Quality Standards. See Okla. Admin. Code § 252:730-5-19(c)(3).
3. The rivers and streams of the IRW have elevated phosphorus concentration levels above natural or background levels. The elevated phosphorus concentration levels have resulted in significant increases in the algae biomass in the rivers and streams of the IRW. The increases in algae biomass have impacted the aesthetics of the rivers and streams of the IRW.
4. Phosphorus concentrations in excess of natural or background levels have caused degradation of water quality in the rivers and streams of the IRW in Oklahoma in contravention of Oklahoma's antidegradation standards. See Okla. Admin. Code § 252:730-5-19(c)(3).
5. Phosphorus concentrations in excess of background or natural levels have caused excessive growth of periphyton, phytoplankton or aquatic macrophyte communities in the rivers and streams of the IRW which impairs the aesthetics, fish and wildlife beneficial uses in violation of Okla. Admin. Code § 252:730-5-9(d).
6. Phosphorus has caused, and is causing, injury to the rivers and streams of the IRW in Oklahoma, as well as the biota therein.
7. Segments of Illinois River Water in Oklahoma have been listed on Oklahoma's 2022 EPA-approved 303(d) list as being impaired for (1) aesthetics, (2) warm water aquatic community, (3) cold water aquatic community, and/or (4) private and public water supply.

Experience:

I am an environmental management professional with over 20 years of experience in water quality monitoring. Based in Oklahoma City, I currently serves as the Environmental Programs Manager at the Oklahoma Water Resources Board (OWRB), where I lead the Streams and Rivers Monitoring Section within the Water Quality Division. I oversee a team of supervisors, full-time staff, and seasonal employees, managing million-dollar plus budgets and spearheading critical monitoring initiatives.

My portfolio includes leading statewide programs such as the Beneficial Use Monitoring Program (BUMP), National Rivers and Streams Assessments, and collaborations with the U.S. Army Corps

of Engineers on river gauging. I have been instrumental in projects like the Grand River Dam Authority Dissolved Oxygen Monitoring, which successfully mitigated low oxygen levels impacting aquatic ecosystems, and stormwater sampling efforts supporting TMDL compliance for Lake Thunderbird. I have also been responsible for making recommendations for the State's Integrated Report for well over a decade.

Beyond my technical expertise, I am an active leader in professional organizations, serving as President of the Oklahoma Clean Lakes and Watersheds Association, Treasurer of the Lake Thunderbird Watershed Alliance, and the Environmental Chair for the Red River Compact. I was also a member of the EPA's Advanced Monitoring Steering Committee. I also frequently present at regional and national conferences.

I hold a Bachelor of Science in Environmental Management from Northeastern State University, with a minor in General Science, and an Associate of Science in General Science from Connors State College. My career reflects a commitment to advancing water quality, ecosystem health, and innovative environmental solutions.

A copy of my resume is attached to this Report.

No compensation has been provided for my testimony and I have not testified at trial or by deposition in the past 4-years.

Methodology:

For the development of my opinions, I have relied upon my experience with performing assessments for the Integrated Report using assessment protocols outlined in OAC 252:740-15 and the 2012 Continuing Planning Process (CPP), as well as the *Final Report to Governors from the Joint Study Committee and Scientific Professionals* (Joint Commission's Report (2016))

Opinions:

The opinions I provide in this report, based on my education, training, knowledge, and experience in the field of water quality management, are held to a reasonable degree of scientific certainty.

1. Yes, Finding #1 above holds true today. The phosphorus concentrations in rivers and streams within the Illinois River Watershed (IRW) in Oklahoma continue to be observed to exceed natural or background levels according to monitoring data collected by the OWRB and the USGS.
2. Yes, Finding #2 above holds true today. That the phosphorus concentrations in the Illinois River, Flint Creek, and Baron Fork Creek are exceeding the total phosphorus criterion for Oklahoma scenic rivers and impairing the aesthetics beneficial use is supported by multiple findings. Oklahoma's Water Quality Standards set a total phosphorus criterion of a 6-

month arithmetic mean¹ concentration not exceeding 0.037 milligrams per liter (mg/L) for scenic rivers, as per Okla. Admin. Code § 252:730-5-19(c)(3). Data from the OWRB and the U.S. Geological Survey (USGS) used in the 2022 Integrated Report indicates that phosphorus concentrations in these water bodies still often exceed this threshold. To assess a water body for the integrated Report, the method for assessment is as follows. The Oklahoma Department of Environmental Quality (ODEQ) begins by soliciting data from various organizations, including tribal entities and the USGS. This collected data is then provided to the OWRB, which organizes it into a single, comprehensive dataset. The completed dataset is analyzed to determine impairment by comparing the data to the standards and protocols outlined in the Use Support Assessment Protocol (USAP) and the Continuing Planning Process (CPP). Based on this analysis, recommendations for listing or delisting water bodies are submitted to the ODEQ, which uses the information to update the State's Integrated Report.

3. Yes, Finding #3 above holds true today. The rivers and streams of the IRW have elevated phosphorus concentration levels above natural or background levels. Data from the OWRB and the USGS show that the elevated phosphorus concentration levels have resulted in significant increases in the algae biomass in the rivers and streams of the IRW. The increases in algae biomass have impacted the aesthetics of the rivers and streams of the IRW. These findings are supported by the work of the 2016 Joint Commission. This Commission's report highlights that phosphorus levels are a critical factor influencing algae growth, particularly in designated scenic rivers like the Illinois River, Flint Creek, and Barren Fork Creek. Research conducted as part of this study explicitly links phosphorus concentrations to periphyton biomass, algal growth, and other ecological factors impacting water quality and aesthetics.

Additionally, the Joint Commission's report's recommendations include maintaining phosphorus levels within specific thresholds to preserve beneficial uses such as aesthetics. It underscores the observable relationship between nutrient loading and increased algal biomass, which negatively affects scenic and recreational values in these waterways.

4. Yes, Finding #4 above holds true today. That phosphorus concentrations in excess of natural or background levels continue to cause degradation of water quality in the rivers and streams of the IRW in Oklahoma, in contravention of Oklahoma's antidegradation standards (Okla. Admin. Code § 252:730-5-19(c)(3)) is supported by several findings.
 - Elevated phosphorus levels in the IRW have been extensively documented. *See, e.g.,* OWRB and USGS water sampling, Arkansas River Compact Commission 2024

¹ This was changed in the Oklahoma Water Quality Standards in 2021 from the previous method using a 3-month rolling Geomean.

Report, and *Water Quality in Oklahoma*, 2022 Integrated Report. This phosphorus is attributed to agricultural runoff, urban wastewater, and legacy phosphorus from past activities ODEQ (2022). Excess phosphorus has led to algal blooms, degraded water clarity, and negative impacts on aquatic ecosystems, particularly in Lake Tenkiller and other downstream areas Joint Commission's Report (2016).

- Oklahoma's antidegradation policy, as outlined in Okla. Admin. Code § 252:730-5-19(c)(3), aims to prevent further deterioration of high-quality water bodies. The documented degradation of IRW waters due to phosphorus, *see, e.g.,* OWRB/ADEQ (2024), violates this standard by impairing designated beneficial uses, including aesthetics and aquatic life support
 - Studies on nutrient pollution in the IRW confirm that phosphorus concentrations have significantly exceeded natural levels, primarily from anthropogenic sources Joint Commission's Report (2016). The impacts include increased algal biomass, which negatively affects water quality and ecosystem health
5. Yes, Finding #5 above holds true today. Phosphorus concentrations in excess of background or natural levels have caused excessive growth of periphyton, phytoplankton or aquatic macrophyte communities in the rivers and streams of the IRW which impairs the aesthetics, fish and wildlife beneficial uses, ODEQ (2023), in violation of Okla. Admin. Code § 252:730-5-9(d).

The Joint Commission's Report (2016) emphasizes that phosphorus enrichment significantly increases algae biomass, particularly in periphyton (attached algae) and phytoplankton (free-floating algae), in the IRW. These excessive growths are directly linked to reduced water clarity and quality, oxygen depletion, and habitat degradation, affecting aquatic species and violating designated beneficial uses like aesthetics and ecological balance. The Joint Commission's Report (2016) highlights the ecological consequences of nutrient overloading, confirming the violation of Oklahoma's Water Quality standards, specifically Okla. Admin. Code § 252:730-5-9(d), which protects against impairments to these beneficial uses report, along with other studies, underscores the critical need for phosphorus reduction efforts in the watershed to protect its ecological and recreational integrity.

6. Yes, Finding #6 above still holds true today. Phosphorus has caused, and is causing, injury to the rivers and streams of the IRW in Oklahoma, as well as the biota therein.

The Joint Commission's Report (2016) provides substantial evidence that elevated phosphorus levels have caused harm to rivers, streams, and aquatic biota within the IRW. The report specifically identifies excessive phosphorus as a primary driver of ecological stress, noting that it leads to increased algal blooms, which degrade water clarity, reduce oxygen levels, and impair aquatic habitats.

The report highlights how the buildup of phosphorus fosters conditions that disrupt the natural ecosystem balance, adversely affecting fish and other aquatic organisms. Such changes are detrimental to biodiversity, water quality, and the aesthetic value of the rivers. The findings emphasize the ongoing injury to these water systems.

7. Yes Finding #7 above still holds true today. These are the segments of Illinois River Water in Oklahoma that have been listed on Oklahoma's 2022 EPA-approved 303(d) list as being impaired for

- Aesthetics: OK121700030010_00, OK121700030080_00, OK121700030280_00, OK121700030350_00, OK121700030290_00, OK121700050010_00, OK121700060010_00
- Warm water aquatic community:
- Cool water aquatic community: OK121700030280_00, OK121700030290_00
- Private and public water supply:
- Primary Body Contact Recreation: OK121700030080_00, OK121700030280_00, OK121700030350_00, OK121700030010_00



Lance Phillips

November 18, 2024

Attachments:

Curriculum Vitae

References:

The datasets generated during and/or analyzed during the current study are available in the OWRB Monitoring Databases at <https://owrb.gselements.com/DataAnalysisIndex.aspx>

The datasets generated during and/or analyzed during the current study are available in the USGS NWIS Database at <https://waterdata.usgs.gov/nwis/qw>

ODEQ (2023). Title 252, Chapter 730, *Oklahoma Water Quality Standards (OWQS)*. Available at: <https://www.deq.ok.gov/wp-content/uploads/deqmainresources/730.pdf>

ODEQ (2023). Use Support Assessment Protocols (USAP). Title 252, Chapter 740, *Implementation of Oklahoma's Water Quality Standards*. Available at: <https://www.deq.ok.gov/wp-content/uploads/deqmainresources/740.pdf>

ODEQ (2022). *Water Quality in Oklahoma, 2022 Integrated Report*. Available from: <https://www.deq.ok.gov/water-quality-division/watershed-planning/integrated-report/>

Joint Commission's Report (2016). *Final Report to Governors from the Joint Study Committee and Scientific Professionals*. Available at: <https://conservation.ok.gov/wp-content/uploads/2021/08/IR-2016.12.19-Final-Report.pdf>

ODEQ (2012). *Continuing Planning Process*. Available at: <https://www.deq.ok.gov/wp-content/uploads/water-division/2012-OK-CPP.pdf>

OWRB/ADEQ (2024). Arkansas River Compact Commission 2024 Report.

Lance Phillips

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Professional Summary

Accomplished environmental management professional with over 20 years of expertise in water quality monitoring and program leadership. Proven track record in overseeing large-scale monitoring projects, managing multidisciplinary teams, and advancing data-driven solutions for sustainable water resource management. Strong background in budget management, stakeholder collaboration, and implementing innovative monitoring technologies.

Professional Experience

Environmental Programs Manager I-III

Oklahoma Water Resources Board (OWRB) | Oklahoma City, OK

July 2013 – Present

- Lead the Streams/Rivers Monitoring Section in the Water Quality Division, supervising 3 supervisors and a team of up to 13 employees (7 full-time, 6 seasonal).
- Manage programs and initiatives including:
 - **GRDA Dissolved Oxygen Monitoring:** Mitigated low DO conditions below Grand Lake, achieving improved compliance and continuous monitoring.
 - **National Rivers and Streams Assessment:** Directed biological monitoring studies to meet federal and state objectives.
 - **Beneficial Use Monitoring Program (BUMP):** Coordinated statewide ambient trend assessments.
 - **City of Norman Storm Water Sampling:** Supported Total Maximum Daily Load (TMDL) compliance for Lake Thunderbird.
 - River gauging in collaboration with the U.S. Army Corps of Engineers and OWRB's Planning Division.
 - **USGS Cooperative Program:** Manage cooperator agreement and contracts.
- Oversaw a ~\$1.2 million budget, including contracts and resource allocations.
- Administered AQUARIUS Time-Series Database, streamlining data collection and analysis workflows.
- Presented at national conferences (e.g., National Water Quality Monitoring Council, North American Lakes Management Society).
- Served as:
 - President, Oklahoma Clean Lakes and Watersheds Association.
 - Treasurer, Lake Thunderbird Watershed Alliance.
- Member of EPA's E-Enterprise Advanced Monitoring Steering Committee.

- Designed and maintained multiple telemetry-based monitoring networks.

Environmental Programs Specialist I-IV

Oklahoma Water Resources Board (OWRB) | Oklahoma City, OK
January 2004 – July 2012

- Managed a team of 5 full-time employees, overseeing daily operations within the Streams/Rivers Monitoring Section.
 - Spearheaded collaboration with the U.S. Army Corps of Engineers to improve river gauging and flood forecasting.
 - Directed BUMP operations and authored technical reports for the GRDA DO Project.
 - Led monitoring for the Washita River Basin 106 TMDL project.
 - Optimized data processes as the Aquarius database administrator, implementing QA/QC workflows and electronic field sheets to reduce errors.
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Education

Bachelor of Science, Environmental Management

Northeastern State University | Tahlequah, OK | 2004

- Minor: General Science

Associate of Science, General Science

Connors State College | Warner, OK | 1996

Additional coursework at *University of Oklahoma* | Norman, OK | 2000–2002

Key Skills

- Environmental Program Management
 - Data Analysis & Database Administration
 - Budget Oversight & Resource Allocation
 - Team Leadership & Staff Development
 - Technical Reporting & Public Presentations
 - Regulatory Compliance & Stakeholder Engagement
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Professional Affiliations

- President, Oklahoma Clean Lakes and Watersheds Association

- Treasurer, Lake Thunderbird Watershed Alliance

References

Available upon request.